

Cambridge University Press 0521496497 - Dynamics of Weed Populations Roger Cousens and Martin Mortimer Table of Contents More information

Contents

	Preface	xi
1	Weed population dynamics – the framework	1
	The impact of weeds	3
	The development of a weed flora	4
	The concept of a habitat	8
	Studying weed populations	9
	Life-cycles and life histories	15
	Overview	18
2	The dynamics of geographic range expansion	21
	Are there recognisable phases in the invasion process?	23
	How can we measure rate of spread from available data?	30
	What governs rate of spread during an invasion?	38
	What makes range expansion cease?	40
	Invasion direction: have species of weeds spread in some	
	directions more than in others?	44
	Have particular modes of dispersal dominated spread	
	between continents?	47
	Models of range expansion: implications for the	
	management of invasions	51
	Conclusions	54
3	Dispersal within and between populations	55
	Patterns of dispersal	56
	Dispersal by different agencies	62
	How important are the various vectors of dispersal?	81
	Conclusions	85



Cambridge University Press 0521496497 - Dynamics of Weed Populations Roger Cousens and Martin Mortimer Table of Contents More information

viii	Contents	
4	Processes involved in the regulation of population	
	density	86
	The seed phase	88
	The plant phase	111
	Vegetative reproductive phase	129
	Conclusions	133
5	The intrinsic dynamics of population density	135
	What types of trajectory are likely?	136
	A short digression: how do we go about mathematical	
	modelling?	140
	Mathematical models of population density	145
	What types of trajectory occur in practice?	161
	Conclusions	167
6	Extrinsic factors affecting population density	169
	The effects of agricultural management factors	170
	The effects of weather	189
	Interactions with other organisms	191
	Using models to explore weed control options	195
	Conclusions	216
7	The spatial dynamics of weed populations	217
-	The implications of habitat mosaics within fields	218
	Field observations of the spread of weed populations	221
	Models of patch expansion	225
	Implications for patch formation	228
	Field observations of the dynamics of weed patches	230
	Meta-population dynamics and weed populations: a	
	conceptual view	235
	Suggestions from simulation models	238
	Conclusions	242
8	The evolution of herbicide resistance	243
	Theoretical background	246
	The genetic basis of herbicide resistance: single and	
	multigene systems	254
	The dynamics of selection	259
	The management of herbicide resistance	278
	Conclusions	282



Cambridge University Press 0521496497 - Dynamics of Weed Populations Roger Cousens and Martin Mortimer Table of Contents More information

	Contents	ix
9	Weed population dynamics: synthesis and	
	prognosis	283
	Is the data base extensive enough?	284
	Can changes in weed populations be predicted?	285
	Are the right questions being answered?	288
	Can studies of weed biology drive changes in farm or	
	land management?	292
	Conclusions	294
	References	295
	Organism index	323
	Subject index	327